IN THE CLAIMS

1. (Original) A method for filtering an input signal, comprising:

applying a portion of the input signal to a plurality of filters to produce a plurality of filtered signal portions of varying smoothness;

comparing the plurality of filtered signal portions to the portion of the input signal to generate a plurality of deviations;

comparing one or more of the plurality of deviations to a maximum deviation limitation to select one of the plurality of filtered signal portions, the selected one filtered signal portion having a deviation less than the maximum deviation limitation; and

generating an output signal representative of a smoothed version of the input signal from a combination of a plurality of successive selected one filtered signal portions which substantially preserve morphology of the input signal.

2. (Original) The method of claim 1, wherein the input signal is a physiologic signal.

3. (Original) The method of claim 2, wherein the input signal is a cardiac signal.

4. (Original) The method of claim 1, wherein the portion of the input signal includes at least one discrete sample.

5. (Original) The method of claim 4, further comprising selecting a filtered signal portion from the plurality of filtered signal portions that has a largest deviation that remains less than the maximum deviation limitation as the select one of the plurality of filtered signal portions.

6. (Original) The method of claim 1, wherein comparing one or more of the plurality of deviations to a maximum deviation limitation to select one of the plurality of filtered signal portions includes determining an initial distance metric corresponding to an initial one of the plurality of filtered signal portions.

7. (Original) The method of claim 6, wherein the initial one of the plurality of filtered signal portions is a select one of the plurality of filtered signal portions for an immediately preceding portion of the input signal.

8. (Original) The method of claim 6, wherein comparing one or more of the plurality of deviations to a maximum deviation limitation includes comparing the initial distance metric against the maximum deviation limitation.

9. (Original) The method of claim 8, wherein the maximum deviation limitation is selected based on the input signal and balances removing noise components with substantially preserving morphology of the input signal.

10. (Original) The method of claim 8, further comprising selecting a second one of the plurality of filtered signal portions having a deviation less than the maximum deviation limitation when the initial distance metric corresponding to the initial one of the plurality of filtered signal portions is at least equal to the maximum deviation limitation.

11. (Original) The method of claim 8, wherein the plurality of filtered signal portions are indexed according to the plurality of deviations, and comparing one or more of the plurality of deviations to a maximum deviation limitation includes determining another distance metric corresponding to a second filtered signal portion that is adjacently indexed to the initial one of the plurality of filtered signal portions and is associated with an increased deviation from the portion of the input signal.

12. (Original) The method of claim 11, wherein at least one of the initial distance metric and the another distance metric is determined by $D(i_n) = |y_{in}(n) - x(n)|$.

13. (Original) The method of claim 11, wherein at least one of the initial distance metric and the another distance metric is determined by:

$$D(i_n) = \frac{1}{4} \sum_{m=n-2}^{n+1} |y_{in}(m) - x(m)|.$$

14. (Original) The method of claim 11, wherein the second filtered signal portion becomes the selected one of the plurality of filtered signal portions when the another distance metric is smaller than the maximum deviation limitation.

15. (Original) The method of claim 1, wherein the plurality of filtered signal portions of varying smoothness is produced using a selection of equations in which n represents the portion of the input signal and m represents an index for the plurality of filtered signal portions that are indexed according to the plurality of deviations, the selection of equations including:

$$y_0(n) = x(n),$$

$$y_1(n) = \frac{1}{2} \sum_{m=-1}^{0} x(n+m),$$

$$y_2(n) = \frac{1}{4} \sum_{m=-2}^{1} x(n+m),$$

$$y_3(n) = \frac{1}{8} \sum_{m=-4}^{3} x(n+m),$$ and

$$y_4(n) = \frac{1}{16} \sum_{m=-8}^{7} x(n+m).$$

16. (Original) The method of claim 1, wherein the select one filtered signal portion is associated with a largest deviation from the portion of the input signal that is less than the maximum deviation limitation.

17. (Original) A method for filtering an input signal, comprising:

generating an output signal representative of a filtered version of the input signal by adaptively removing noise components from the input signal, wherein each of the input signal and the output signal includes discrete samples;

determining a desired filtering level from a number of filtering levels for each of the discrete samples of the input signal; and

determining a desired smoothed signal from a number of smoothed signals corresponding to the desired filtering level, wherein the desired smoothed signal is calculated from a selection of equations including:

$$y_0(n) = x(n),$$

$$y_1(n) = \frac{1}{2}\sum_{m=-1}^{0} x(n+m),$$

$$y_2(n) = \frac{1}{4}\sum_{m=-2}^{1} x(n+m),$$

$$y_3(n) = \frac{1}{8}\sum_{m=-4}^{3} x(n+m),$$ and

$$y_4(n) = \frac{1}{16}\sum_{m=-8}^{7} x(n+m).$$

18. (Original) A system for filtering an input signal, comprising a processor to:

receive a portion of the input signal;

produce a plurality of filtered signal portions of varying smoothness from the portion of the input signal;

determine a plurality of deviations between the plurality of filtered signal portions and the portion of the input signal;

compare one or more of the plurality of deviations to a maximum deviation limitation to select one of the plurality of filtered signal portions, the selected one filtered signal portion having a deviation less than the maximum deviation limitation; and

generate an output signal representative of a smoothed version of the input signal from a combination of a plurality of successive selected one filtered signal portions which substantially preserve morphology of the input signal.

19. (Original) The system of claim 18, wherein the portion of the input signal includes at least one discrete sample.

20. (Original) The system of claim 18, further comprising an implanted medical device that includes the processor.

21. (Original) The system of claim 20, wherein the portion of the input signal includes a portion of a cardiac signal and the implanted medical device is configured to receive the portion of the cardiac signal.

22. (Original) The system of claim 18, further comprising an implanted medical device and an external programmer that includes the processor in communication with the implanted medical device.

23. (Original) The system of claim 18, wherein the processor is configured to select a filtered signal portion from the plurality of filtered signal portions that has a largest deviation that remains less than the maximum deviation limitation as the select one of the plurality of filtered signal portions.

24. (Original) The system of claim 23, wherein the processor is configured to determine an initial distance metric corresponding to an initial one of the plurality of filtered signal portions.

25. (Original) The system of claim 24, wherein the processor is configured to compare the initial distance metric against the maximum deviation limitation.

26. (Original) The system of claim 25, wherein the maximum deviation threshold is selected based on the input signal and balances removing noise components with substantially preserving a morphological representation of the input signal.

27. (Original) The system of claim 25, wherein the processor is configured to select a second one of the plurality of filtered signal portions having a deviation less than the maximum deviation limitation when the initial distance metric is at least equal to the maximum deviation limitation.

28. (Original) The system of claim 25, wherein the plurality of filtered signal portions are indexed according to the plurality of deviations, and the processor is configured to determine another distance metric corresponding to a second filtered signal portion that is adjacently indexed to the initial one of the plurality of filtered signal portions and is associated with an increased deviation from the portion of the input signal.

29. (Original) The system of claim 28, wherein at least one of the initial distance metric and the another distance metric is determined by $D(i_n) = |y_{in}(n) - x(n)|$.

30. (Original) The system of claim 28, wherein at least one of the initial distance metric and the another distance metric is determined by:

$$D(i_n) = \frac{1}{4} \sum_{m=n-2}^{n+1} |y_{in}(m) - x(m)|.$$

31. (Original) The system of claim 28, wherein the processor is configured to select the second filtered signal portion as the selected one of the plurality of filtered signal portions when the another distance metric is smaller than the maximum deviation limitation.

32. (Original) The system of claim 18, wherein the plurality of filtered signal portions of varying smoothness is produced using a selection of equations in which n represents the portion of the input signal and m represents an index for the plurality of filtered signal portions that are indexed according to the plurality of deviations, the selection of equations including:

$$y_0(n) = x(n),$$

$$y_1(n) = \frac{1}{2}\sum_{m=-1}^{0} x(n+m),$$

$$y_2(n) = \frac{1}{4}\sum_{m=-2}^{1} x(n+m),$$

$$y_3(n) = \frac{1}{8}\sum_{m=-4}^{3} x(n+m),$$ and

$$y_4(n) = \frac{1}{16}\sum_{m=-8}^{7} x(n+m).$$

33. (Original) The system of claim 18, wherein the selected one filtered signal portion is associated with a largest deviation from the portion of the input signal that is less than the maximum deviation limitation.

34. (Original) A system for filtering an input signal, comprising:

means for producing a plurality of filtered signal portions of varying smoothness from a portion of the input signal;

means for generating a plurality of deviations between the plurality of signal portions and the portion of the input signal;

means for comparing the plurality of deviations to a maximum deviation limitation to select one of the plurality of filtered signal portions that has a deviation less than the maximum deviation limitation; and

means for generating an output signal representative of a smoothed version of the input signal from a combination of a plurality of successive selected one filtered signal portions which substantially preserve morphology of the input signal.

35. (Original) The system of claim 34, wherein the portion of the input signal includes at least one discrete sample.

36. (Original) The system of claim 34, further comprising an implanted medical device that includes the processor.

37. (Original) The system of claim 36, wherein the implant signal includes a cardiac signal, and the implanted medical device is configured to receive the cardiac signal.

38. (Original) The system of claim 34, further comprising an implanted medical device and an external programmer that includes the processor in communication with the implanted medical device.

39. (Original) The system of claim 34, further comprising means for selecting a filtered signal portion from the plurality of filtered signal portions that has a largest deviation that remains less than the maximum deviation limitation as the select one of the plurality of filtered signal portions.

40. (Original) The system of claim 39, wherein the means for comparing the plurality of deviations to a maximum deviation limitation includes means for calculating an initial distance metric corresponding to an initial one of the plurality of filtered signal portions.

41. (Original) The system of claim 40, wherein the initial one of the plurality of filtered signal portions is a select one of the plurality of filtered signal portions for an immediately preceding portion of the input signal.

42. (Original) The system of claim 40, wherein the means for comparing the plurality of deviations to a maximum deviation limitation includes means for comparing the initial distance metric against the maximum deviation limitation.

43. (Original) The system of claim 42, wherein the maximum deviation limitation is selected based on the input signal and balances removing noise components with substantially preserving morphology of the input signal.

44. (Original) The system of claim 42, further comprising means to index the plurality of filtered signal portions according to the plurality of deviations, and means to select a second one of the plurality of filtered signal portions having a deviation less than the maximum deviation limitation when the initial distance metric corresponding to the initial one of the plurality of filtered signal portions is at least equal to the maximum deviation limitation.

45. (Original) The system of claim 42, further comprising means to index the plurality of filtered signal portions according to the plurality of deviations, and means for determining another distance metric corresponding to a second filtered signal portion that is adjacently indexed to the initial one of the plurality of filtered signal portions and is associated with an increased deviation from the portion of the input signal.

46. (Original) The system of claim 45, wherein at least one of the initial distance metric and the another distance metric is determined by $D(i_n) = |y_{in}(n) - x(n)|$.

47. (Original) The system of claim 45, wherein at least one of the initial distance metric and the another distance metric is determined by:

$$D(i_n) = \frac{1}{4} \sum_{m=n-2}^{n+1} |y_{in}(m) - x(m)|.$$

48. (Original) The system of claim 45, further comprising selecting the second filtered signal portion as the selected one of the plurality of filtered signal portions when the another distance metric is smaller than the maximum deviation limitation.

49. (Original) The system of claim 34, wherein the plurality of filtered signal portions of varying smoothness is produced using a selection of equations in which n represents the portion of the input signal and m represents and index for the plurality of filtered signal portions that are indexed according to the plurality of deviations, the selection of equations including:

$$y_0(n) = x(n),$$

$$y_1(n) = \frac{1}{2}\sum_{m=-1}^{0} x(n+m),$$

$$y_2(n) = \frac{1}{4}\sum_{m=-2}^{1} x(n+m),$$

$$y_3(n) = \frac{1}{8}\sum_{m=-4}^{3} x(n+m),$$ and

$$y_4(n) = \frac{1}{16}\sum_{m=-8}^{7} x(n+m).$$

50. (Original) The system of claim 34, wherein the selected one filtered signal portion is associated with a largest deviation from the portion of the input signal that is less than the maximum deviation limitation.

51. (Original) A system for filtering an input signal, comprising:

a processor to receive the input signal and generate an output signal representative of a filtered version of the input signal by adaptively removing noise components from the input signal, wherein:

the input signal includes a number of discrete samples;

the processor is configured to determine a desired filtering level for each of the discrete samples of the input signal;

the processor is configured to determine a desired smoothed signal from a number of smoothed signals corresponding to the desired filtering level; and

the desired smoothed signal is calculated from a selection of equations including:

$$y_0(n) = x(n),$$

$$y_1(n) = \frac{1}{2}\sum_{m=-1}^{0} x(n+m),$$

$$y_2(n) = \frac{1}{4}\sum_{m=-2}^{1} x(n+m),$$

$$y_3(n) = \frac{1}{8}\sum_{m=-4}^{3} x(n+m),$$ and

$$y_4(n) = \frac{1}{16}\sum_{m=-8}^{7} x(n+m).$$

52. (Original) A system for filtering an input signal detected by at least one detector, comprising:

means for receiving the input signal;

means for generating an output signal representative of a filtered version of the input signal by adaptively removing noise components from the input signal;

means for determining a desired filtering level from a number of filtering levels for each discrete sample of the input signal; and

means for determining a desired smoothed signal from a number of smooth signals corresponding to the desired filtering level, wherein the desired smoothed signal is calculated from a selection of equations including:

$$y_0(n) = x(n),$$

$$y_1(n) = \frac{1}{2}\sum_{m=-1}^{0} x(n+m),$$

$$y_2(n) = \frac{1}{4}\sum_{m=-2}^{1} x(n+m),$$

$$y_3(n) = \frac{1}{8}\sum_{m=-4}^{3} x(n+m),$$ and

$$y_4(n) = \frac{1}{16}\sum_{m=-8}^{7} x(n+m).$$